

# Redfish

JUNE, 2012 (ISSUE #12)



## WRASSE WRAP UP!

REEF



Reefkeeping Journal - Part II

BLOG



Interzoo 2012 Photo Tour!

TROPICAL



Bristlenose catfish!



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#### General Advice Warning

The advice contained in this publication is general in nature and has been prepared without understanding your personal situation, experience, setup, livestock and/or environmental conditions.

This general advice is not a substitute for, or equivalent of, advice from a professional aquarist, aquarium retailer or veterinarian.

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# About Redfish

Redfish is a free-to-read magazine  
for fishkeeping enthusiasts.

At Redfish we believe in the free exchange of information to facilitate success by aquarium and pond hobbyists. Each month Redfish Magazine will bring you dedicated sections on tropical, coldwater, marine and ponds.

Redfish was founded in early 2011 by Jessica Drake,  
Nicole Sawyer, Julian Corlet and David Midgley.

We hope you enjoy this, the twelfth issue of Redfish.

古池や蛙飛込む水の音  
ふるいけやかわずとびこむみずのおと



## Aqua One AquaReef

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# OFF THE SHELF

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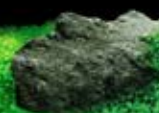
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# Today In The Fishroom

with Mo Devlin

Come on a tour of Segrest Farms with Mo Devlin!



Segrest Farms



# Aquamojo

Text and photos by Mo Devlin



Five thousand six hundred fresh water fish tanks and 60,000 gallons of salt water...someone pinch me, I'm in fishy heaven. These were some of my first thoughts as I walked through the doors of Segrest Farms, the largest wholesaler of marine and aquarium fish in the United States. Opened in 1961 with a mere 16 tanks, the company is now a giant that supplies over a thousand stores per week in addition to supplying public aquariums and research facilities with freshwater tropicals, aquatic plants, marine fish and invertebrates, reptiles and amphibians...and I was going to be there for a week with my camera.

About a month prior I made contact with Sandy Moore, VP of Segrest and arranged the trip. The goal was to supply them with some fresh photos of stock and the farm to use on their website and various marketing endeavors. Aquatic photography is a passion for me. I take thousands of photos every year and have been posting online regularly for the past fifteen years under the heading, "Today in the Fishroom". This job was a whole new kettle of fish (pun intended) since over a thousand fish species were on the list to be photographed, both freshwater and marine. Somewhere deep in the back of my mind, I remember my father telling me, "When you make your hobby a job, you lose both." Maybe...but one heck of a way to check out.

Under normal conditions, the majority of the photos I take are done right in the tank the fish resides. I have on occasion moved the fish to a specially prepared photo tank. I knew that one of the challenges in Florida would be exactly where I would take the photo. Having visited other large fish rooms, I understood that simply positioning lights over the various tanks and using them for photos would be unacceptable for the quality I was looking to achieve. With that in mind, I prepared a two and a half gallon tank and a few smaller plastic seven inch cubes to be shipped in advance of my arrival.

My visit to Segrest was a series of revelations on many levels. Prior to that, like many, I had preconceived notions of what to expect. Certainly lots of fish tanks and fish, but what I didn't expect was the level of professionalism that permeated from the top to the bottom of the organization. Marketing director, Mike Tuccinardi, took me on my first walk through the farm. After seeing the vast array of tanks in multiple buildings he laid eye opener number one on me. "We turn over our entire inventory in about three days." All of the fish in the tanks that I was seeing were gone within three to seven days.





Long-finned Danios



a Titan Triggerfish



A collection of mollies

He explained the process perfected after years in business. A team of salespeople man the phones daily talking to stores across the country. An order is placed with a note going to the proper building housing the fish. "Pickers" take the order and gather the fish in various colored buckets, each order designated by a single color signifying one order. The buckets are put on an ever moving conveyor belt that snakes throughout the building and ends at the bagging station. The fish are bagged, boxed and moved immediately to another conveyor belt that takes it directly to the truck for shipment via UPS next day air or air freight.

The night before the first day of shooting I opened the box sent prior that contained my various photo tanks. Setback number one, the two and a half gallon tank was cracked during shipping. This left me with only the plastic cubes. Getting another tank wouldn't be a problem, however it would require preparation before it could be used. On all of the photo tanks I painted the sides, back and bottom with a flat white paint. This would give me better more even light diffusion as well as an "infinity" white background that would better show the beautiful colors of the fish as well as provide a uniform style to all of the images.

One thing that I was certain was that it would be difficult, if not impossible, to photograph all of the fish that were at Segrest. Mike and I devised a system where he would identify a "hit list" of fish that they either wanted photographed or needed for one reason or another. Day one's list included close to a hundred different species of fish, all fresh water.

One of the most challenging aspects would not be the photos, but because of the volume, it would be the work flow. I decided that rather than set up at a location far away from the fish, the best place would be right next to the fish. The process evolved as fish on the list were put in buckets and placed on nearby tables. As one subject was photographed they were moved back to the bucket. It was literally an assembly line.

The staging area was on the top of a table in the back of the main fish house. The plastic cube was not only very useful, but ended up being the work-horse for the entire shoot. Of the 3500 photos taken, more than 90% were done in that small seven inch "tank".

The setup was atypical of most that I use with mul-



tiple flash units trained on a relatively small area. I placed the cube on top of another white plastic box for additional diffusion. Four Nikon SP-900 flash units were used to light the tank. One was placed on top, one was placed below, and a flash was placed on either side directed into the cube below the actual photo tank. All of the flash units were diffused. After balancing the amount of light, the end result was a very nice area for photographing the fish.

Another challenge in taking pictures of fish is making sure the fish actually cooperate. Even in an area that is as small as this, if the fish moves to the back or side or simply refuses to swim around, it becomes nearly impossible to get a useable image. Because of the amount of light I was using, I was able to shoot at a very low ISO (100), a fast shutter speed (1/250 - 1/320th) and an aperture that was between f32 - f40. The end result was that the depth of field allowed me the ability to "zone focus". Put simply, the camera was "in focus" for the fish regardless of where they swam in the cube.

The real problem however was that even in focus, if the fish didn't pose, the picture wasn't happening. This didn't occur with every fish, but it was occurring more than expected. At times it was as simple as adding a couple fish of the same species. This put them at ease and encouraged them to move around. Other times they needed an additional push....literally. Necessity is the mother of invention. And since the work flow was being disrupted by uncooperative models I devised a tool I aptly named the "fish hook". I took a large paper clip and straightened it leaving a slight "L" end at the bottom. With this I was able to adjust the fish in the tube. Most often it just made them move off the wall and swim. Sometimes I was actually able to lift the fish up and into position. Sounds crazy, but it worked exceptionally well.

Day one ended after eleven hours of nonstop photos. As I was leaving I noticed that all of the tanks in the building were a light shade of pink. I inquired and Mike said that all the tanks receive a prophylactic dose of medicine once a week. Great care is taken to assure the quality and health of all the fish in the tanks. The bottom line is that quality isn't just a goal, it's a prerequisite. The process to assure the good health of the fish is detailed. According to VP, Sandy Moore, *"When fish arrive here, they are visually inspected for obvious external parasites and then fully acclimated. Any fish that we anticipate problems, like wild collected fish,*



the detail on the eye of this puffer is entrancing



a Red line torpedo barb



the iconic Domino Damselfish



Growing to 60+ centimetres, and with teeth to match, the Vampire Baracuda isn't a vegetarian, but it's not a barracuda either - it's a cousin of the tetras in the cynodontid group.



a mouthbrooding Betta, *B. macrostoma*.



Goldstriped Cardinalfish

are treated with both an external treatment and given medicated foods within three hours of arrival. We treat our systems prophylactically based upon the country of origin of the fish, the species of fish and expected bacteria and parasites."

She continued, "Our trained aquaculture staff performs precautionary skin and fin scrapes, as well as any necessary necropsies on site. In the off chance we run across some pathogen we're not familiar with, we have two veterinarians trained in aquatics on retainer, plus access to the University of Florida/University of Florida Tropical Aquaculture for more in depth diagnostics. We inspect every tank every day, and perform additional inspections during the picking, bagging and quality assurance process to insure the highest quality animals are shipped." For year, Segrest Farms has assumed a behind the scenes presence in the aquarium hobby, relying on their customers, the local fish stores to remember their name and place in the market. Times change, and today Segrest Farms is hoping to establish new ties directly with the hobbyist.

According to Marketing Director, Mike Tuccinardi, "The aquarium hobby has evolved so much in the past decade with the thriving online forums, the access to and availability of information, not to mention the technology and attitudes behind fish keeping. We felt it was important to reconnect to the hobbyists through social media and through our website. Despite the fact that we only sell to retailers, we have always tried to support the hobby that supports our industry. We have been donating to many major aquarium clubs for years, and have always allowed and encouraged hobbyists to stop by and tour our facility, which we are proud to show off."

During my stay there I saw many fish that I thought would make a nice addition to my collection. "The most frequent question I get from hobbyists is, of course, "how can I get this fish?", said Mike. "As a wholesaler we do not sell to the general public but we try to make it easy for people to find our fish. Our website includes a store locator where hobbyists can type in their zip code and find the store nearest them that regularly orders from us. Many of these shops will gladly take customer requests or special orders and our sales team is happy to work with those stores to make sure you get what you're seeking."

So much of what happens in our hobby revolves



around the internet. And that's fine. It's a great place to get information and see photos. But in the end, nothing beats that personal touch that you get by visiting your local fish store and browsing the tanks. Mike said it best, *"Those are the places where our hobby grows, where new lifelong aquarium enthusiasts are often first introduced to the living art of a lush planted aquarium or the complex beauty of a reef aquarium."*

This was a new and exciting experience for me. Never in my wildest dreams would I have ever seen, let alone had the opportunity to photograph, the assortment of fish as during my trip. At the end of day three I had over two thousand photos, a stiff neck, sore feet and an ear to ear grin. By day five, I literally was done. I had taken 3500 new photos of close to a thousand different species of fish. My time spent with the staff at Segrest Farms was memorable.

Perhaps the single biggest takeaway, beyond the professionalism, was the atmosphere. While I was there, a new variant of Betta fish arrived. It was called the "dumbo" betta named for the oversized white fins that looked like the famous elephant ears. Everyone from salesman on up to vice president rushed out to see the fish. As they were gathered in a group holding up the bag and actively admiring the new fish, I thought to myself...these people really ENJOY their job. With the thousands of fish that literally come through their doors every week, no one is so jaded that they don't get excited about a single new arrival...even with something as simple as a betta.

Both Aquamojo and Segrest Farms are on Facebook. We'd love to get feedback and certainly answer any questions you might have on photography or fish. Stop by and say hello...and most importantly, enjoy the hobby. 🌿



Ocellated Frogfish



a pair of Orange-Fin Clownfish



#### ABOUT THE AUTHOR

Mo Devlin is the owner of Aquamojo.Com. He maintains three thousand gallons of fresh water tanks. Over his thirty years in the hobby he has successfully bred many of the Central and South American cichlid fishes. His passion for New World cichlids is only rivaled by his love of photography. Over the years, he has posted images of his collection frequently in his "Today in the Fishroom" series on line across many national and international fish forums. Mo has spent two terms on the board of trustees for the American Cichlid Assn, was chairman of the organization in 2010, and has been the Publicity chairman for the past decade.

# BRISTLENOSE



The common name Bristlenose Catfish refers to a number of very similar species from the genus *Ancistrus*. These hardy and popular freshwater aquarium fish are easily recognised by their suckermouths and on mature males, by the extravagant tentacles displayed on their snouts. Females may also have some snout tentacles, but these are only ever short and restricted to the lip area.

*Ancistrus* spp. are naturally found throughout a wide range of rivers and floodplains of the Amazon in South America. Their natural diet is algae and the small organisms collectively known as “aufwuchs” which live within the clumps of algae. In the aquarium they make excellent algae cleaners, actively but gently scraping algae from just about any surface. Even in aquariums with an abundance of algae some supplemental feeding may be necessary and Bristlenose will accept a variety of foods including spirulina wafers, blanched zucchini, cucumber or pumpkin, as well as the occasional bit of flake or pelleted food which may have been missed by other tank mates. It is usually recommended that a log or some bogwood be provided - Bristlenose like to have a dark, shady place to retreat to and they also enjoy scraping away at and ingesting a little wood. There have been some suggestions that this may even be quite important for the digestive process in these fish.

Aquarium bred strains have become quite hardy



Typical bristlenose habitat in Brazil.  
Photo by Jorge Andrade

fish over many generations of breeding and are able to thrive in a wider range of water conditions than wild caught specimens. Generally they will be happy in water of a pH range between 6.5-7.8 and temperatures between 22-27 degrees Celsius.

They are non-aggressive and tend to keep out of the way of most fish, as a result they are a good fit for most community freshwater aquariums. *Ancistrus* spp. have a modified stomach which is capable of absorbing some atmospheric oxygen. This means that they can survive temporarily in low-oxygen





flowerpot on its side, a hollow log or some artfully arranged pieces of slate are among the many objects that they will happily use as a cave. The male will clean and occupy the cave and then display to the female to entice her to lay her eggs inside. After spawning the male cares for the eggs, gently fanning a stream of fresh water over them. After hatching the fry remain in the cave for a short period of time whilst they absorb their yolk sacs, after which time they begin to venture out of the cave to find algae to eat. The small fry look like miniature versions of the adults. So long as there is enough food available and good water quality is maintained they are for the most part capable of looking after themselves, though they are vulnerable to being eaten by any predatory fish in the tank. Supplemental algae wafers or pieces of suitable vegetable matter is very useful when there is a batch of Bristlenose fry around.

As diligent algae eaters which don't get bigger than 15cm in length these hardy, interesting fish are an excellent choice for a variety of freshwater aquarium communities. With their ease of keeping and reproduction it's no surprise that they're easy to find in most aquarium stores. ♣

environments by gulping air from the surface of the water. For best health however, oxygen levels in the aquarium do need to be kept reasonably high - these fish are most comfortable at the bottom of the aquarium where dissolved oxygen levels are lower. If they have to frequently gulp at the surface to get enough oxygen they will quickly become stressed and their health will suffer as a result.

A healthy, mature pair of Bristlenose are usually quite easy to breed. They are cave spawners and so a suitable site needs to be supplied - a small





# INTERZOO 2012

by Anthony Ramsey

The 32nd Interzoo took place from May 17-20 in Nürnberg, Germany and this year boasted over 1,539 exhibitors from more than 53 countries. The majority of exhibitors were European with the largest numbers of participating companies from Germany (321), Italy (104) and the UK (100). China's rapidly expanding interest was evident and they fielded 293 exhibitors along with the USA's 136 exhibitors.

Anthony Ramsey from Reef River Reptile in Sydney, Australia, takes us on a photographic tour of the show!



Trade fair activity  
© WZF / Thomas Geiger



Trade fair activity  
© WZF / Frank Boxler.





Above: The Tropical Marine Centre stand at Interzoo 2012.



Bottom: TMC's stand showcased their various products from the aquaGro and AquaRay range for planted and marine aquariums, respectively.





**Left:** This lovely aquarium with its Japanese rock garden style is lit by two AquaRay tiles.

**Middle:** This sloping, planted aquascape features some beautiful driftwood. It's from AquaFlora, a dutch company.

**Bottom:** Giesemann Aquaristic kit on a lovely, open-top planted aquarium.





**Right:** The Eheim display included some beautiful aquascapes.

**Middle:** An Eheim aquarium with a dutch-style aquascape.

**Bottom:** Japanese-minimalistic styles obviously influence this planted aquarium, again from Eheim. The glass doors to the cabinet are a stylish addition to this setup.





**Top:** The Aqua One stand at Inter-zoo 2012.

**Middle:** Aqua One's new AquaReef 350 featured on the stand. It's the same model used in the Reefkeeping Journal (see page 25).

**Bottom:** the stand also featured products for herp keepers from the Reptile One range.







**Left:** Tunze Protein Skimmers being run through their paces in a display.

**Middle:** The Fluval area of the Hagen stand.

**Bottom:** Eric from Reef River Reptile in Sydney, Australia taking in some of the new all-in-one aquariums available from Fluval.







Lit by a large aquaPAD, a sleek-looking impossibly thin (14mm) sheet of LEDs, created by [aquaLEDs.de](http://aquaLEDs.de) this display sports a vertiable mountain of *Ricordia* along with the occassional zoanthid.



The red and green fluorescence of some of the *Ricordia* species under LED lights is eye-poppingly good!



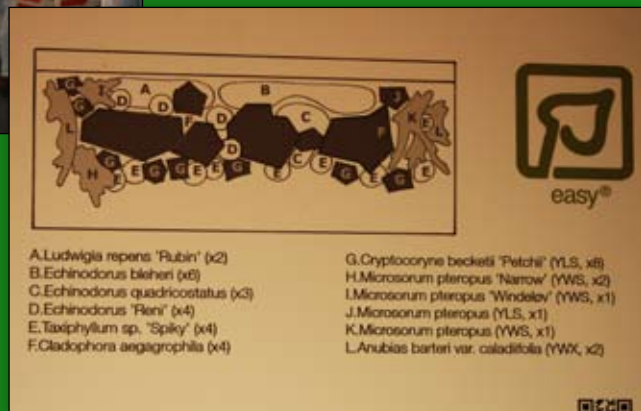
**Right:** This lovely planted tank by Italian Aquarium Plants (Crystal farm), features a beautiful school of Congo Tetras that swim about a central island design.

**Middle:** Another offering from Gieseemann Aquaristic, this detailed shot shows the use of large pebbles and the plantings amongst them.

**Bottom:** Gieseemann Aquaristic have created an underwater rockery planting *Cryptocornye* species and other clumping or spreading species throughout the landscape.

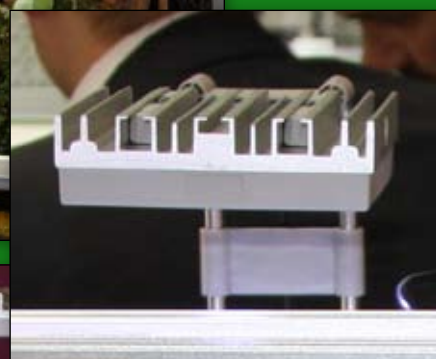






Tropica's stand at Interzoo was astoundingly beautiful. Magical planted tank displays, complete with planting maps to illustrate the compositions. The map shown above is for the massed, dutch-style planting shown on the bottom of the page.





SolarStinger multi-coloured LED aquarium lights from EconLux, slickly designed with aluminium fins for cooling and a neat mounting system. Variously available in marine, freshwater and herp configurations.





By the power of Acrylic! Aquarium step setup from Seaplast, demonstrating the flexibility of this material over traditional glass aquariums. It's also much lighter.



a jellyfish tank - via the French company Jellyfish Concepts.

For those in the Trade Interzoo is a fantastic event that showcases the latest technologies for the pet industry - I hope you've enjoyed this photo tour of the show! Interzoo next takes place in the Exhibition Centre Nuremberg from 29 May to 1 June 2014.

## ABOUT THE AUTHOR

### Anthony Ramsey

Anthony Ramsey has owned and operated retail aquarium stores in Sydney, Australia for the past 9 years. Anthony was previously a director and vice president of the Pet Industry Association of Australia (PIAA). Having kept fish his entire life Anthony's passion lies with fishes from the family Cichlidae, having previously served as the president of the NSW Cichlid Society Inc.

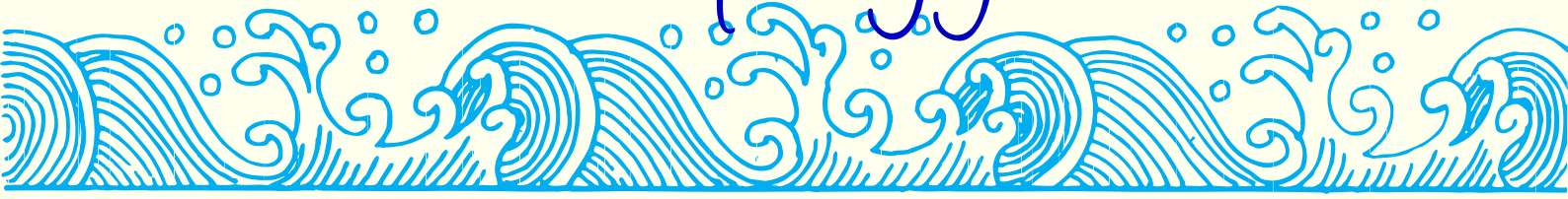


His current business, Reef River Reptile, is based in Hornsby in Sydney, Australia.



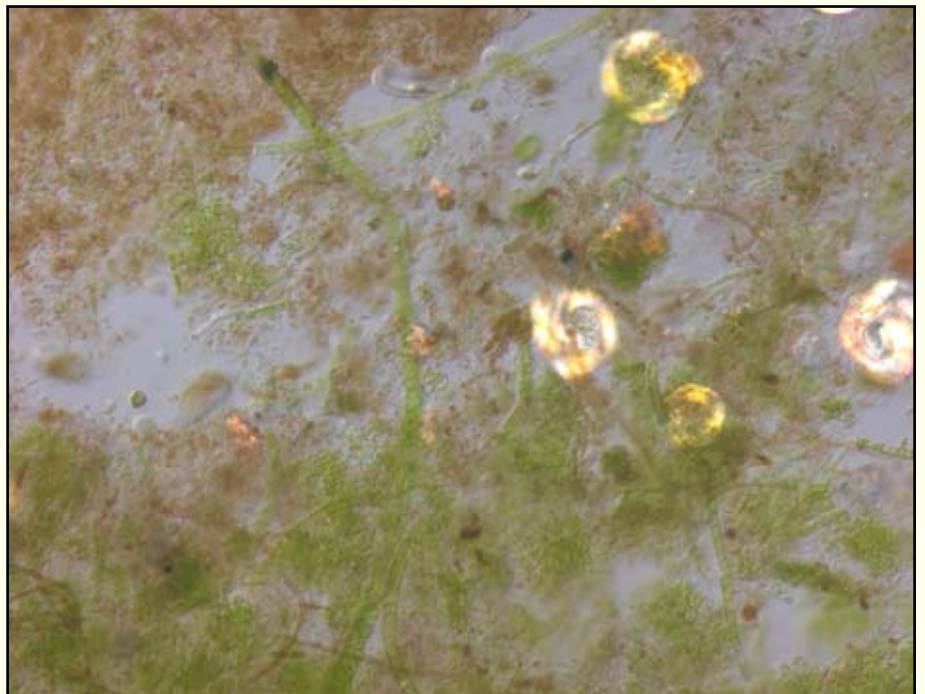
# FIRST TIME AT SEA

## *a reefkeeping journal*



Well, the first month is up and it's going well. Though to be honest, I'm not sure I've got enough experience to make that claim. All my hitchhikers appear to be thriving, I've not added anything except RO and light to the aquarium - so presumably that's enough to maintain them through this period.

One thing that's obviously changed is my algae situation. It's been interesting, in a kind of messy way. It started about 2 weeks into the cycle with a bloom of brownish algae that covered just about everything. This brownish algae was ruthlessly fast growing, and seemed only to grow on the glass, substrate and rocks - the water itself remained crystal clear. During the 10 day-brown-algae fest I had to clean the front and side glass almost every day. This algae (which I presume is a diatom or a community of diatoms) does not seem to form any real "secondary" structures - it just grows on the various surfaces of the aquarium as a thin film, turning virtually the entire aquarium a brownish shade. It's a bit distressing, but I'm reliably informed by experts that these algal blooms are common - and I just need to ride it out. Diatoms are interesting organisms and probably warrant at least a brief discussion of their biology.



Diatoms are the subject of a bit of taxonomic wrangling as to what group of algae they all belong to, given my lack of expertise on the topic - I'm

**a scraping of the brown algae film growing on the glass viewed microscopically (100x) reveals a complex community of organisms, including various brown and green algae. Numerous protozoa inhabit the films and can be seen busily swimming around.**

## AquaReef – The Ultimate **MARINE** Aquarium

- Inbuilt sump filtration system
- The specially designed cabinets with no back panel offer ample ventilation to reduce heat and humidity build-up
- A chiller can be added to the system without the need for extra pumps
- Highest quality 'white' glass to fronts on the 300 & 400 models, all 3 sides on the 275 cube ensure optimum clarity
- Cabinet comes built and is exclusively manufactured from alloy frame and plastics to ensure maximum resistance to salt and moisture damage normally associated with marine aquariums
- All models fitted with Aqua One's patented 'Quadrolite' T5 lighting system with reflector panels to increase light output and 4 x T5 tubes to provide a balanced, visually pleasing spectrum
- Combines wet/dry filtration with a venturi style protein skimmer with needle wheel pump to ensure excellent water quality
- Has a flexible duckbill outlet to return water back to the aquarium

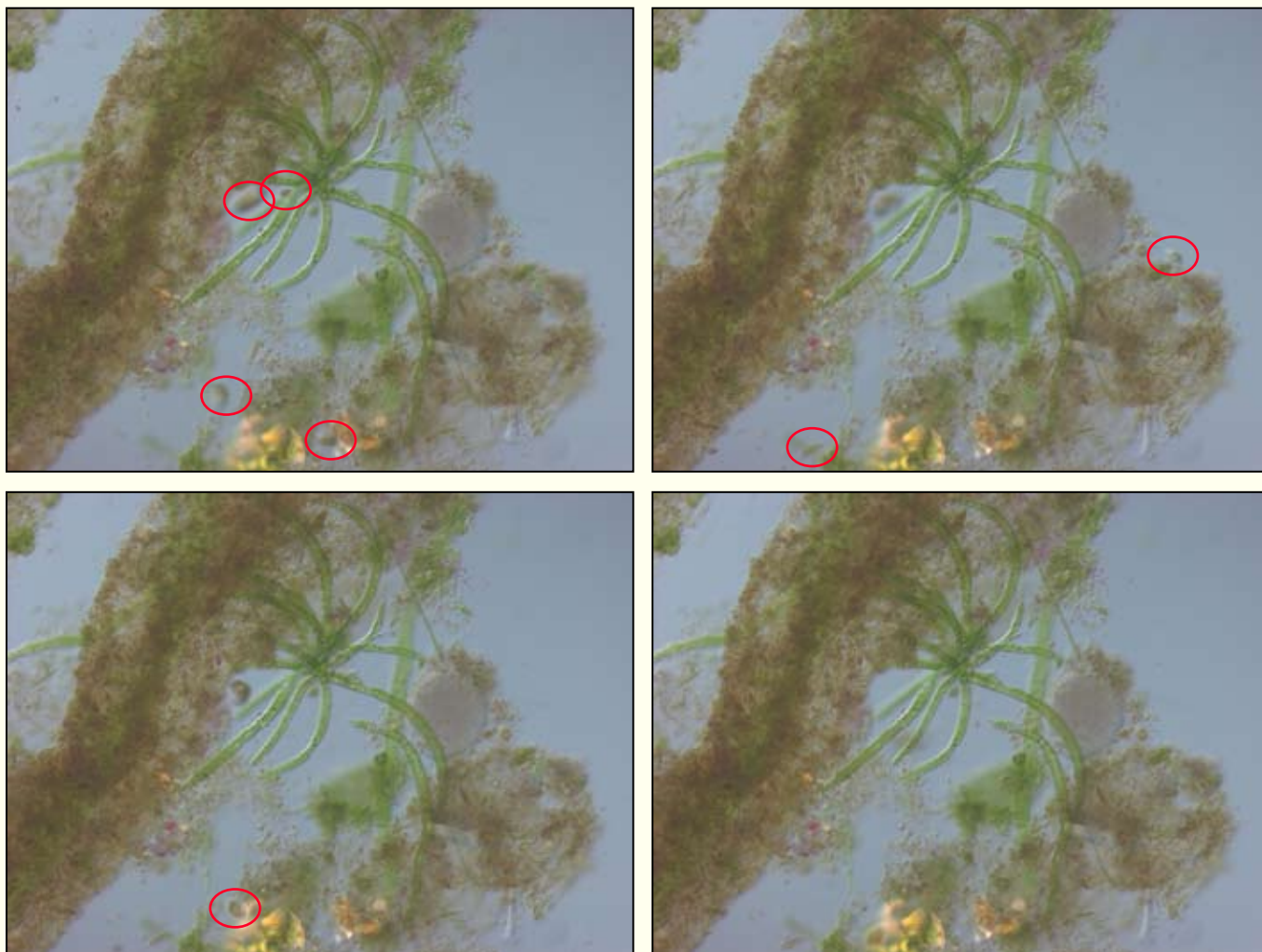


MODEL	VOLUME	DIMENSIONS
AquaReef 300	300L	102 L x 52 D x 73/88 cm H
AquaReef 400	400L	132 L x 52 D x 73/88 cm H
AquaReef 275	275L	70 L x 70 D x 77/79 cm H

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going to give you the taxonomy given at Wikipedia and presume that all diatoms are part of the class Bacillariophyceae. What makes diatoms unique is their production of a cell wall made up of silica (that's glass, more or less). Unusually for living creatures, silicon and its availability is a limiting factor in their abundance. Marine diatoms get the silicon they need to thrive from silicic acid (there's a scientific difference between silicic acid and silicates, but the terms are used interchangeably by many reef keepers) and presumably there's an excess of this compound available in the early stages of a marine aquarium. It seems likely that the live rock, given its emersion in the ocean, isn't the likely cause and presumably substrate (whether it be coral sand, beach sand



The diatom bloom is actually a bit of a misnomer - while there's lots and lots of diatoms, there's a host of other organisms that grow during this early stage of aquarium cycling. Red ovals indicate some motile organisms (note how their position varies across these 4 frames). 100x magnification.

or crushed marble) contains enough silicic acid to get diatoms blooming. Somewhat surprisingly, a quick scrap of the glass and a look under the microscope reveals that the diatom bloom is a fairly complex event. It's not just diatoms that are blooming! Indeed, there's a host of organisms that grow rapidly, including many species of diatoms, some green algae, along with a host of wiggling protozoa.

It's interesting to note that when the worst of the "diatom bloom" passes, at least in my case, other algae take their place. Its reminiscent of clearings opening in the rainforest canopy and the various ecological successions that occur until the void in the forest is filled. In my case, directly after the "diatom bloom", red "hair algae" appeared. I thought this might be the dreaded red-slime cyanobacteria - but it looks a bit "fluffy" - and microscopic examination confirms its almost certainly not a Cyanobacteria. Quite what it is - red algae aside - remains a bit of a mystery, regardless the "claw-like" growth points are rather interesting looking structures.



100x magnification, the claw-like growing tips of a red "hair" algae from my new reef tank. Maybe it's an *Asparagopsis* species or a *Calothrix* -- I'm not sure.

Perhaps the most vigorous algae that's grown to date is the green "hair algae" (shown right). As I write this article, it covers most of the rear of the aquarium. So much so, that I began to get a little nervous and sourced some clean-up crew (more on those in a minute) -- suffice to say though, that they've made something of dent in the algae-wall.



At 100x magnification, the large filaments of green "hair" algae are surprisingly thick. This algae has grown thickly on the rear glass of the aquarium, of all of my clean-up-crew, the *Trochus* snails seem to enjoy eating it the most.

About a week after the worst of the green-hair algae explosion, I began to notice the classic red-slime algae (a Cyanobacteria) growing in small patches across the coral sand at the front of the aquarium. Oddly,



it's growth is limited to one side of the aquarium. The lighting is even across the aquarium with my quad-T5 lighting - so I can only presume some other factor is causing the restriction in its growth. The only possibility I can see is that the corner in which it is growing probably gets a bit less water flow. Perhaps more turbulence might provide an answer. I'm open to ideas - so feel free to send a note my way via facebook or email!

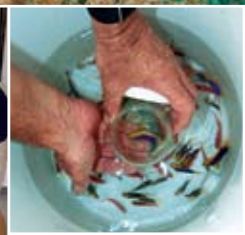


**Classic slimey red Cyanobacteria. It differs from other red algae notably by its lack of secondary structure.**

The very fresh and high-quality nature of the live rock I received from Cairns Marine meant that cycling, at least the initial stage cycling, occurred very rapidly. Within 10 days ammonia and nitrite were at levels close to zero and nitrates had begun to climb. I've been around a lot of local fish shops in my life and have looked at lots of live rock. There's plenty available in the hobby that you'd be hard pressed to call "live". Some aquariums stack it in unlit tanks with poor turbulence, while others light the rock - but keep triggerfish in the tank with the rock (I've seen this at two separate aquariums in recent weeks). Such practices, at least in my mind, can't be helpful and probably serve only to remove many of the valuable creatures on the rock. Putting on my microbial ecologists hat for a minute, live rock that's treated badly (as I described above) almost certainly has impacts on the indigenous microbial communities on the rock (the very communities you're relying on to manage waste in your aquarium). With this in mind - I'd argue that it is very important to source your rock from reputable dealers and suppliers - and insist on its quality and care - ask questions about where it's come from, how long it's been in stock etc. End rant!

As nitrate concentration starts to climb, the real difference between the marine and freshwater world becomes apparent. Where in freshwater one relies entirely on water changes, in a reef tank denitrification is now the name of the game (in terms of nitrogen management). In simple terms, denitrification is the transformation of nitrogen (in the form of nitrates  $\text{NO}_3^-$ ) to nitrogen gas ( $\text{N}_2$ ). The beauty of nitrogen gas, is that being a gas - it can simply bubble-out of your aquarium. The tricky part of this process is that production of this gas requires anoxic (oxygen-free) conditions. The deep-sand bed DSB and the live rock both provide suitable sites for nitrogen transformations. There are a couple of ways this process can potentially occur, the chemistry is a bit hardcore - and is summarised in the box below for those that are interested. If you're not keen

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on chemistry just skip over the reactions - but take a quick note of the names of processes that occur. All of these processes - except DNRA - results in nitrogen gas production. There's dogma that suggests that most of the nitrogen gas production produced via these processes occurs via heterotrophic denitrification - a process carried

## ABOUT THE AUTHOR

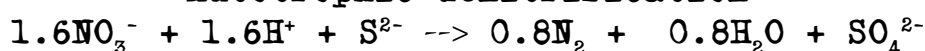
### David Midgley

When he's not editing Redfish Magazine, David Midgley is a scientist who has a PhD in Microbial Ecology and works with microbes in the subsurface. He lives in Sydney, Australia with his wife, kids, cats and now - Reef Aquarium.

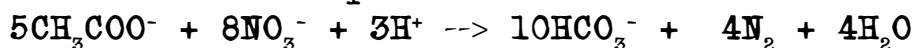


## ANAEROBIC NITROGEN TRANSFORMATIONS

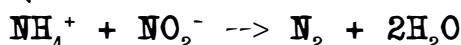
### Autotrophic denitrification



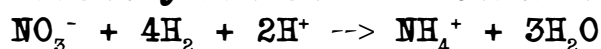
### Heterotrophic denitrification



### ANAMMOX (Anaerobic ammonia oxidation)



### DNRA (Dissimilatory nitrate reduction to ammonium)



out by a host of bacteria but most famously by *Comamonas*, *Pseudomonas* and *Paracoccus* species. Presumably vodka dosing and other efforts to supply carbon sources are aimed at fuelling this process - but more on those ideas and amendments in a future entry. For now what's needed is an understanding that the times for reproduction of organisms that undertake these processes are relatively slow. This has implications for your strategies to combat this rising nitrate. The key message is that aquariums capable of supporting natural nitrate reduction don't arise overnight -

and we're really probably talking a period of many months before this process stabilises.



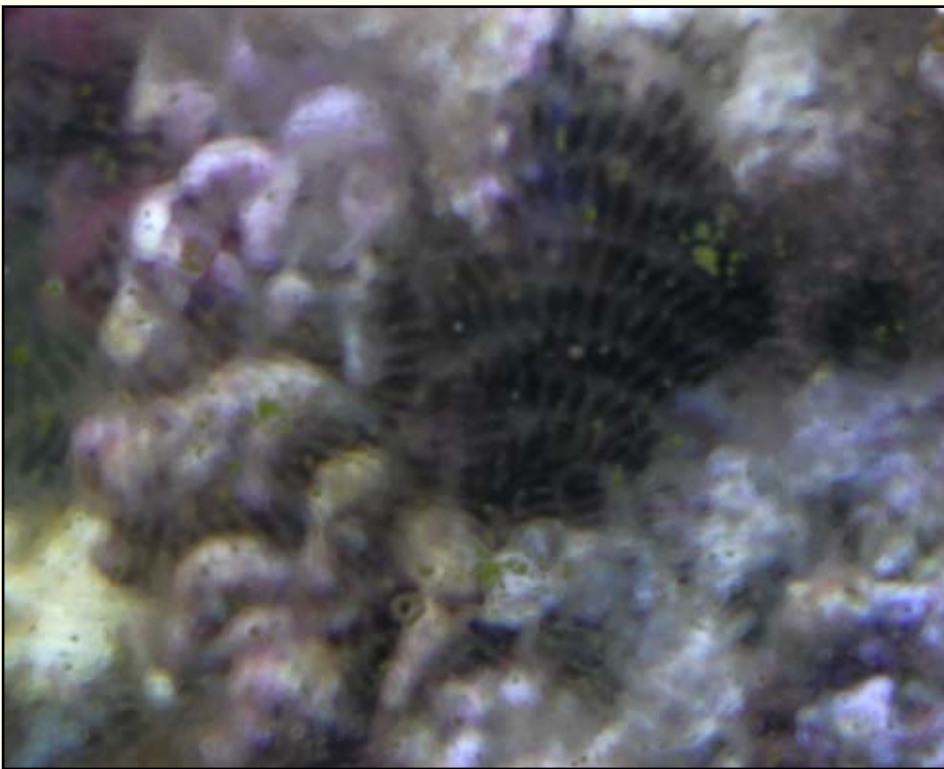
One of my new clean up crew, hermit crabs are useful algae eaters.

In the meantime, the rising nitrates in my aquarium are fuelling the growth of algae - it's a form of nitrate control on its own - but it's pretty unsightly and as I mentioned earlier I've added some clean-up crew to deal with the mess. I

visited my local aquarium store and I picked up a crew that comprised a few hermit crabs and snails. The hermits are the most regularly visible of the clean-up crew and I see them most days grazing on algae in the foreground - mostly on the substrate - but occasionally on the live rock itself. In terms of snails, the clean-up crew I purchased contains at least 6 species: there are three species of *Trochus* snail - the species shown top right, along with two other species. Identifying snail species - as I discovered writing this piece is a bit of an art - they are a pretty diverse group



a *Trochus* snail slides across the glass of the aquarium, rasping at the patches of algae. *Trochus* species can get large - this individual is around 5cm tall. Interestingly, *Trochus* create completely clear patches of glass while *Cerith* snails (below) eat algae into distinct patterns.



Left: Distinct patterns of algae remain on the glass after a *Cerith* snail has fed. Right: a *Cerith* snail rasping on algae. NB: they should have pointy-tipped shells. This individual is missing the bottom part of their shell.

and I'm certainly no expert on snail taxonomy. Suffice to say the two other *Trochus* types look quite different. While both are pyramid-shaped like the species shown top-right, one sports spikey protrusions on the shell and the other is reddish and has a different pattern of bumps on the shell. In addition to my host of *Trochus*, I also picked up three *Cerith* snails (shown above, right), some





Above: *Nassarius* snails (also known as dog whelks or nasa snails) are great scavengers for the marine aquarium. Unfortunately, they are somewhat tricky to photograph (thus the use of my hand here) as they tend to spend most of their time buried in the substrate with just their siphon (shown top, marked with an arrow) protruding into the water.



Turbo snails - along with some burrowing snails from the genus *Nassarius*.

I'm very fond of the *Nassarius* snails - they aren't visible most of the time, but they are active, moving about beneath the coral sand. It reminds me of cartoon moles in a garden, raising the soil as they dig. At dusk and dawn the two individuals I have seem to emerge from the substrate to cavort a bit on the glass before seeking cover in the substrate again once the the main lights turn on.

Lots of people online seem to rave about the algal eating prowess of the Turbo snails - and my specimens (bottom, left) spend most of their time grazing the patches of algae - particularly on the glass. Based on my observations they appear slightly less active than the *Trochus* species - but my specimens are smaller than my *Trochus*. Perhaps I just have some lazy Turbos! Time will tell. One upside to Turbo snails over their *Trochus* cousins is their propensity to breed in the aquarium. While this is possible for *Trochus*, it's MUCH less common.

The last snail I want to mention was, and still is, a bit of a mystery to me. He or she cruises about the rocks and

Left: Turbo snails are great algae eaters. They are shaped more like a garden snail than the *Trochus* species and better still (and unlike *Trochus*) they'll readily breed in most reef aquariums.

glass and has an obvious orange-red foot. This red-footed snail came as part of the clean-up crew I purchased, but I've been unable to ID it -- suggestions and comments via Facebook or email would be most welcome!

All the hitchhikers I referred to in my May entry are doing well, with the exception of the *Halimeda* macroalgae which has most died away. Other macroalgae species, including some native *Caulerpas*, have begun to grow on some of the rocks. There's a species with round leaves which is pretty slow growing. The more rapidly growing species I've transferred to the refugium/DSB where I can more closely monitor their growth and remove if necessary. I've added a light to my sump and transferred some of the smaller pieces of liverock to one of the compartments in the sump. It's all looking pretty good I think.

Next month I'll be showing you how the aquarium looks now, I'll be adding my first corals and probably some fish - I'll discuss some of the pests I've encountered thus far and how I've succeeded (or not!) in their removal. We'll revisit my sump, the DSB and that fast growing algae. Thanks to everyone who emailed about my progress and made suggestions and comments! Keep them coming! ♣

David - [david@redfishmagazine.com.au](mailto:david@redfishmagazine.com.au)



**a mystery - this red-footed snail was part of the clean-up crew I purchased at my local aquarium.**

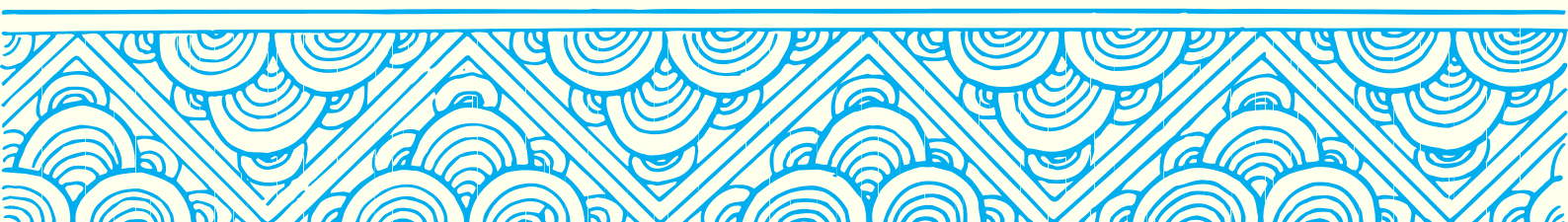






photo by Khantipol

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The family Labridae is one of the larger families of marine fishes of interest to aquarists. With over 600 species in more than 80 genera, there are a huge variety of wrasses ranging from small colourful fairy wrasses to huge fish that would be more familiar to divers than aquarists such as the humphead maori wrasse (*Cheilinus undulatus*) and the Eastern blue grouper (*Achoerodus viridis*). As far as families of marine aquarium fish go, wrasses are only bettered in number by gobies, though while gobies are a mix of marine, freshwater and brackish fish, wrasses are the largest family of wholly marine fish. The wrasses that are commonly encountered by aquarists are vast and varied, from peaceful fish that are suited to small aquariums to some of the most boisterous fish kept in marine aquaria and some rather interesting predators.

# WRASSES

BY AARON SEWELL







a Six-Bar Wrasse (*Thalassoma hardwicke*).

Photo by Henry Bush



a Lined-Cheek Wrasse (*Oxycheilinus digramma*).

Photo by Rob @ BBM Explorer



a Checkboard Wrasse (*Halichoeres hortulanus*).

Photo by Rob @ BBM Explorer

Wrasses are found throughout the world's tropical, sub-tropical and temperate oceans and while many temperate species are fairly drab in colour, owing to their kelp and seagrass filled environments, many of the tropical species are among the most brightly coloured fish encountered by aquarists. Despite the fact many species of wrasse are either sexually dimorphic or sexually dichromatic – or even both, most wrasses are protogynous hermaphrodites which means they develop first as females and then change sex to males as they grow. Wrasses are often found in harems where the dominant fish is male and reproduction occurs between a single male and several females through broadcast spawning. As seen in birds, female wrasses often exhibit dull colours such as white, yellow and brown while males commonly exhibit bright blue, red and green colours. In some species (notably those from the genus *Coris*), juveniles exhibit a different colouration to both adult males and females.

Almost without exception, wrasses are carnivores, ranging from planktivores to piscivores and just about everything in between. In many cases this means that they are not inherently reefsafe as, despite the fact they will generally not consume corals, anemones or clams, they will generally see many other beneficial invertebrates such as worms and crustaceans (this can be seen as good or bad depending on what is housed in the aquarium) as food.

One of the most distinguishing features of wrasses is that they almost exclusively swim using only their pectoral fins for propulsion. The body shape is generally laterally flattened to cigar shaped with fairly minimal tapering towards the tail (though finnage may give the illusion of tapering). Wrasses also pos-



sess a unique jaw structure that allows decoupling of the jawbones. What this means is that the jaw can protrude during feeding allowing extra reach for prey capture. A notable example of this is the jaws of the slingjaw wrasses (*Epibulus insidiator* and *E. brevis*) whose jaw makes them an interesting and unique group. The jaw of the slingjaw wrasse can be extended by several centimetres, slowing this ambush predator to catch prey that would be out of reach of many other predators.



Labouti's Fairy Wrasse (*Cirrhilabrus laboutei*)

### FAIRY & FLASHER WRASSES – CIRRHLABRUS & PARACHEILINUS

These smaller wrasses are ideal for reef aquariums as they pose little to no threat to most invertebrates or other fish. While fairy and flasher wrasses will feed on small crustaceans such as copepods and amphipods, they can genuinely be considered ree-safe unlike many of their relatives. Also unlike many of their relatives, fairy and flasher wrasses are neither particularly bold nor boisterous and fare well with other small fish



Eight-line Flasher Wrasse (*Paracheilinus octotaenia*)



a Lubbock's Fairy Wrasse (*Cirrhilabrus lubbocki*).





a Moon Wrasse (*Thalassoma lunare*). Photo by Leonard Low.



Cortez Rainbow Wrasse (*Thalassoma lucasanum*)  
Photo by Laszlo Ilyes.



Klunzinger's Wrasse (*Thalassoma rueppellii*)  
Download Issue #6 of Redfish for details on this species!

including gobies, blennies, dartfishes and assessors. However, unless being kept in a very large aquarium, these fish (along with many other small wrasses such as *Macropharyngodon* spp.) should be avoided if the aquarium houses fish such as dragonets, *Amblygobius* spp. or other fish that are known to feed almost exclusively on copepods and amphipods, as the wrasses can devastate populations of these small crustaceans.

### THALASSOMA WRASSES

The wrasses of the genus *Thalassoma* are generally not regarded as reefsafe and they are best kept with other large, aggressive, or at least boisterous, fish. On the plus side, these fish are both extremely robust and in most cases, very colourful. Like most larger wrasses, these fish can be quite destructive when kept with small fish or motile invertebrates such as crustaceans. *Thalassoma* wrasses, despite being heramic fish, do not generally tolerate conspecifics even those of the opposite sex, in close proximity in all but the largest aquariums. Though not among the largest of wrasses, with most species reaching around 20-25cm, *Thalassoma* wrasses must be kept in large aquariums due to their highly energetic nature. They will commonly swim laps of the aquarium in a figure 8 pattern. This makes them great to observe but it can spook smaller or less boisterous fish causing them to remain more reclusive.

### BIRDNOSE WRASSES GOMPHOSUS

Birdnose wrasses are probably the most unusual fish in the Labrid family and probably amongst the most unusual kept by marine aquarists. Their long proboscis-like mouth is ideal for pulling prey, including small fish, out of small holes and crevices. Despite the small mouth on the end of the long snout, they will eagerly tear larger prey apart



a Birdnose Wrasse in the Red Sea (*Gomphosus caeruleus*)



Detail of the Birdnose Wrasse's "beak" (*Gomphosus varius*). Photo by Brian Gratwicke.



The majestic Broomtail Wrasse (*Cheilinus lunulatus*) is a beautiful fish, its 50cm length, however, dictates that it is best left in the ocean unless you've got suitable housing for such a creature. The species primarily feeds on hard shelled invertebrates: mostly molluscs.





The Harlequin Tuskfish (*Choerodon fasciatus*). Photo by Leonard Low.

in order to consume it. This means that birdnose wrasses should not be kept with any small motile tankmates and are best kept in large predatory aquariums with fish such as groupers, surgeonfishes and triggerfishes.

### TUSKFISHES CHOERODON

With a set of teeth that almost makes them unrecognisable as wrasses, tuskfishes are rarely kept in reef aquariums, and are more commonly housed alongside some of the most aggressive marine fish kept by aquarists, including sharks, triggerfishes and moray eels. These fish are capable of swallowing small fish whole or tearing larger fish apart into bite size pieces. Their diet consists largely of crustaceans, molluscs

## ABOUT THE AUTHOR

### Aaron Sewell

In 2004 Aaron completed a BSc (Marine Science) at the University of Sydney with majors in marine biology and tropical marine science. Since 2001 he has been involved with the aquarium industry at hobbyist and retail level and now works in aquarium product development. Aaron is a former committee member of the Marine Aquarium Society of Sydney and has collected fish and corals in Fiji for the US and European aquarium industries. Aaron has been writing for several local and international aquarium magazines since 2004.





and occasionally fish though they will also eat worms (such as tubeworms or polychaetes) and various other invertebrates. Along with triggerfishes, tuskfishes are probably the furthest thing from a reefsafe fish that an aquarist will encounter. However, tuskfishes are extremely robust fish and due to their brilliant colours, the Harlequin Tuskfish, *Choerodon fasciatus*, is a highly sought after fish that commands a high price due to the high value as an export fish in the USA, Asia and Europe.

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### CORIS WRASSES

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The coris name is thrown around often but some of the more commonly encountered “coris” wrasses actually belong to the genus *Halicheores*, a genus of similarly shaped but often smaller species. Although there are 26 recognised species of *Coris*, only 2 are commonly offered to aquarists. *Coris gaimard* and *C. aygula*, both of which are referred to as clown wrasses, reach substantial sizes (35 and 60cm respectively) making them less than ideal for the average aquarium. As juveniles and sub-adults, *Coris* wrasses hide by burying themselves in soft substrate, a behavioural characteristic shared with many other wrasses. Juveniles can be quite secretive but as adults, these fish can become quite boisterous and may be aggressive to tankmates they perceive as a competitive threat.

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### LEOPARD WRASSES MACROPHARYNGODON

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While wrasses are generally considered to be hardy, active fish, the leopard wrasses of the genus *Macropharyngodon* buck the trend. They are usually quite shy and have a particularly poor record in captivity. In particular, these fish can be very finicky feeders and often refuse any foods offered. Generally foods such as brine or mysis shrimp are the best options, though nutrition-



Yellowtail Coris Wrasse (*Coris gaimard*)  
Photo by Laszlo Ilyes.



a temperate species, the Mediterranean Rainbow Wrasse (*Coris julis*)



The Clown Coris (*Coris aygula*)

ally enhanced varieties such as spirulina loaded brine shrimp or nutrient soaked (using something like Selcon or any similar enrichment formula) mysis shrimp will be far more beneficial. Despite their poor captive record, the leopard wrasses are among the most attractive wrasses available, particularly amongst those that are suitable for reef aquariums.

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## HOGFISHES

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### BODIANUS

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Hogfishes vary greatly in size, from the commonly encountered Diana's Hogfish which reaches around 15cm to larger species reaching around 50cm. As far as wrasses go, hogfishes are not particularly aggressive, though they will tolerate aggressive tankmates and will stand their ground if they feel threatened. Because of this, they, like most wrasses, spend much of their time actively patrolling the aquarium, which makes them very appealing for aquariums. They can become territorial and will actively defend a section of rocky substrate they have claimed as their own. They will readily accept most foods and can optimistically be considered reefsafe.

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## LINED WRASSES

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### PSEUDOCHEILINUS

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While the common name lined wrasses is not a widespread name, it is quite apt given the most common species available to aquarists are the Four-line Wrasse (*Pseudocheilinus tetrataenia*), Six-line Wrasse (*P. hexataenia*) and Eight-line Wrasse (*P. octotaenia*). These fish are generally small (averaging around 10cm), peaceful and relatively robust. Their diet consists largely of small crustaceans and they will generally accept prepared foods such as frozen mysis shrimp, pellets or flakes. Six-line Wrasses are notorious for their ability to control populations of pests such as



Spotfin Hogfish (*Bodianus pulchellus*).

Photo by Cliff1066™ @ flickr.



Barred Hogfish (*Bodianus scrofa*).

Photo by Philippe Guillaume.



Lyretail Hogfish (*Bodianus anthioides*).

Photo by Brian Gratwicke.





a Six Line Wrasse (*P. hexataenia*).  
Photo by Brian Gratwicke.

coral eating flatworms (such as *Convolutriloba retrogemma*) as well as pyramid snails, the well known Tridacnid parasites.

### CLEANER WRASSES LABROIDES

Cleaner wrasses are one of the most well known genera of wrasses, familiar to aquarists, divers and even casual observers of documentaries. The feeding behaviour of these fish, despite not being particularly unique on the reef, makes cleaner wrasses, particularly the Bluestreak Cleaner Wrasse, *Labroides dimidiatus*, an icon of the reef. Cleaner wrasses are found inhabiting cleaning stations on the reef, along with cleaner shrimp along with various juvenile wrasses and butterflyfishes. Unlike most wrasses, cleaner wrasses generally fare poorly in captivity, possibly due to the fact they are forced to change their diet dramatically. Often these fish are purchased as a means to control parasites such as whitespot on other fish in the aquarium, though there is little evidence to suggest they actually make any substantial difference to infected aquarium fish. The best chance of maintaining these fish long term is to purchase juvenile individuals that may be less set in



Bluestreak Cleaner Wrasse (*Labroides dimidiatus*) cleaning a Yellow Margin Moray Eel (*Gymnothorax flavimarginatus*).



Golden Cleaner Wrasse - *Labroides phthiophagus*





Snorkelling in Sydney, Blue Grouper, a large species of wrasse (*Achoerodus viridis*) can sometimes be seen.

their dietary ways.

Unfortunately it's not possible to cover the full array of wrasses seen in the trade, or even those that are common, in a short article. There are a vast array of other common wrasses including those from the genera *Halichoeres*, *Wetmorella* and one of the most interesting genera in the family, *Epibulus*, the slingjaw wrasses. Despite their great variety, they do not get along well with others. Unless the aquarium is particularly big, wrasses should only be kept one to an aquarium, with few exceptions. This applies to both wrasses of the same and different species despite the fact that wrasses are naturally social fish.

Many wrasses are sold as juveniles and it is important to be aware of the potential size the fish can reach before it is purchased. Few people realise the cute little bright orange *Coris gaimard* that is barely 6cm long in the aquarium store will reach as much as 35cm. Whether you have a nano reef or a 1000L predator tank, there are plenty of wrasses that will fit any aquarium. With a huge family of colourful, robust and active fish, it is little surprise that such a huge variety are available to aquarists. 🌸

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<http://www.edaspsg.org/>

## QUEENSLAND

### MARINE AQUARIUM SOCIETY OF REGIONAL QUEENSLAND

<http://www.masrq.org>  
e: [info@masrq.org](mailto:info@masrq.org)

### MARINE AQUARIUM SOCIETY OF QUEENSLAND

<http://www.masa.asn.au/masq.php>  
e: [info@masq.ws](mailto:info@masq.ws)  
P: 07 3261 8582

### New South Wales Cichlid Society (NSWCS)

<http://www.nswcs.org.au/>

Meets 19:30, 1st Sat. each  
month, Nuwarra Public  
School, Moorebank.

New South Wales Cichlid So-  
ciety (NSWCS) - Illawarra.  
Meets 19:30, 2nd Sun. each  
month, Kanahooka High  
School, Kanahooka.

Australian Koi Association  
<http://www.akakoi.com>



## ACT

### Canberra and Districts Aquarium Society (CDAS)

<http://drupal.cdas.org.au/>  
Meets 19:30, 3rd Tue. each  
month. Harmonie German  
Club, Narrabundah.

### Canberra Killifish Study Group (CKSG)

[http://drupal.cdas.org.au/con-  
tent/killi-corner](http://drupal.cdas.org.au/content/killi-corner)

### SOFA FOR SALE

\$1200 ONO

Phone: Jimmy Li

, Burwood  
only.



### ANGFA Qld

<http://www.angfaql.org.au>

GOLD COAST AQUARIUM  
SOCIETY (GCAS)  
<HTTP://WWW.GCAS.NET.AU>

Marine/Reef Aquarium Society  
<http://www.aandtociety.org.au>  
E: [aandtociety@gmail.com](mailto:aandtociety@gmail.com)

Aquarium and Terrarium  
Society of Queensland  
<http://www.aandtociety.org.au>  
E: [aandtociety@gmail.com](mailto:aandtociety@gmail.com)



Bella, Norweigan forest.  
Lost on 12/05/11  
\$\$\$ Reward offered  
Contact Don Smith

Queensland Cichlid  
Group  
<http://www.qcichlid.org>  
Meets 20:00, 1st Fri.  
each month. Bar Tai  
Hall, Clayfield.

## SOUTH AUSTRALIA

South Australian Aquarium  
Society Inc.  
<http://aquariums.2om.com/>

### South Australian Native

Fish Association  
[www.sanfa.org.au](http://www.sanfa.org.au)  
[sanfa@bold.net.au](mailto:sanfa@bold.net.au)

## TASMANIA

Tasmanian  
Aquarium Society

Brisbane Aquatic  
Plant Study Group  
<http://bpsg.frell.org/>

## WESTERN AUSTRALIA

Marine Aquarium  
Society of WA  
[www.masa.asn.au/maswa/](http://www.masa.asn.au/maswa/)

[maswa@masa.asn.au](mailto:maswa@masa.asn.au)

phone:  
Chris Sutton  
0419 858 108

Perth Cichlid Society  
[www.perthcichlid.com.au](http://www.perthcichlid.com.au)

Koi Society of WA  
[www.koichubwa.com](http://www.koichubwa.com)  
Meets 19:30, 4th Wed each  
month. Rotary Hall, South  
Perth.

03 62298449

Hobart Cichlid Society  
[www.tassiecichlids.com](http://www.tassiecichlids.com)

Wide Bay Aquarium Society  
[wbaqs.com.au/forum/index.php](http://wbaqs.com.au/forum/index.php)

## NEW ZEALAND

Federation of  
New Zealand Aquatic Societies  
<http://www.fnzas.org.nz/>



## INTERNET

Oz fish for sale  
<http://www.ozfishforsale.com.au>

SaltyTank  
<http://www.saltytank.com>





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